

Table 2: Number of specimens of each of the Spanish Autonomous Regions present in the MNCN bird collection.

Autonomous region	no. of specimens	Autonomous region	no. of specimens	Autonomous region	no. of specimens
Andalucía	751	Ceuta	5	Melilla	80
Aragón	342	Comunidad Valenciana	409	Navarra	75
Canarias	73	Extremadura	867	País Vasco	102
Cantabria	188	Galicia	459	Principado de Asturias	278
Castilla la Mancha	2891	Islas Baleares	96	Región de Murcia	79
Castilla León	2038	La Rioja	144	unknown	499
Cataluña	206	Madrid	2675		

MONROE (1990) and BARREIRO & PÉREZ DEL VAL (2000). The holotype of a Ralliforme subspecies, *Gallinula chloropus lozanoi* GIL, 1918 a, and also the holotypes of the subspecies *Uria aalge ibericus* BERNIS, 1948, *Galerida theklae berengueri* CABRERA, 1922 and *Galerida theklae aguirrei* CABRERA, 1922 (HERNÁNDEZ CARRASQUILLA 1998).

Until 1998 (BARREIRO & PÉREZ DEL VAL 1998) there was no published catalogue of this collection, only one manuscript dated 1846 and written by the director of the Museum at the time, Dr. M.P. GRAELLS.

Furthermore, only LOZANO (1911) and GIL LLETGET (1935, 1941, 1943) have published papers on a small quantity of specimens of this collection. However, thanks to the Agencia Española de Cooperación Internacional (AECI), which has provided the necessary funds, two new inventories were published in 2001: one on the museum holdings of specimens collected in Equatorial Guinea (PÉREZ DEL VAL 2001) and another on Asian specimens (ALONSO et al. 2002).

Collection facilities

Microsoft Access is the software being used to computerize the data and the management system of the collection. More information about this system can be found in BARREIRO et al. 1994.

The arrangement of the collection in the stores follows a systematic order in the case of orders and families, genus and species being stored in alphabetical order. The HOWARD & MOORE (1991) Checklist of Birds of the World is used for the arrangement and nomenclature of the specimens.

The Spanish MNCN and the Real Jardín Botánico collections has been recognized by the European Commission as a Major Research Infrastructure during the years 2002-2004. This provides a great opportunity for European scientists who would like to visit our collections because the European Commission

can finance their travel, accommodation and subsistence costs as well as laboratory fees. More information is available at www.museociencias.com or e-mail: BIODIBERIA@mncn.csic.es.

University Collections

In general, the Spanish Universities have only small collections, used for teaching, which contain few specimens of each species and are not very useful for systematic research. However, an important collection of bird skeletons is held at the Universidad Autónoma of Madrid (for more information contact Dr. A. MORALES, arturo.morales@uam.es).

There are other smaller collections in a few local museums. Among them is that in the Museo de Ciencias de Vitoria, Alava in the Basque Country which may be of interest (contact D. G. BELAMENDÍA gbela@gm.es for further information).

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- J. BARREIRO, Museo Nacional de Ciencias Naturales. José Gutierrez Abascal, 2. 28006-Madrid. Spain. jbarreiro@mncn.csic.es

Bamberg's Natural History Museum – the Scientific Significance of Small Collections

Frank D. STEINHEIMER

The Natural History Museum, Bird Group, Tring, UK

Abstract. Bamberg's Natural History Museum (North-Bavaria, Germany) was founded at the end of the 18th century. The Bamberg museum was once listed as comparable with the collections of Leiden, Paris and London (Jaeck 1815). At the end of the 19th century, it held about 1000 bird specimens of 800 species, all exhibited in the exhibition hall from 1794.

Investigations into the history of the avian specimens have now delivered very surprising discoveries among the 1500 bird mounts. Several regional first records, locally extinct species and rarely documented vagrants are found in the European section. However, much more interesting are the exotic birds. The most exciting discoveries are specimens from Johann Baptist von Spix's exploration of Brazil in 1817-1820 and from Johann Heinrich Christian Sturm's former collection at Nürnberg. Bamberg also houses several specimens of the famous Australian collection of Amalie Dietrich, one of the few female collectors.

Bamberg Museum is a good case study demonstrating that even small collections may be of scientific importance for biogeography, conservation, taxonomy and the history of science.

Key words. Bird collection, restoring data, Naturkunde-Museum Bamberg

1. INTRODUCTION

In 1791 the archbishop of Bamberg and Würzburg, Franz Ludwig VON ERTHAL (1730-1795), decided to open a faculty of natural science at the University of Bamberg, subsequently also adding a „Naturalienkabinett“, as the Natural History Museum was named at that time, for the purpose of studying natural objects (MÄUSER 1995). Even before the official decision to found a museum at Bamberg had taken place, many specimens, including birds, had arrived at Bamberg (e.g. ca. 100 bird specimens arrived in 1790 from Geheime Kabinettssekretär Hofrat SCHMIDT of Ansbach). A new exhibition hall had to be built to house the increasing collections. It was fitted within the old building of the former Jesuit college at Bamberg's Fleischstrasse. The exhibition cases arrived in 1794, all nicely decorated with busts of famous scientists from DIOSKURIDES to LINNÉ, which were carved by Georg Joseph MUSCHELE (for more details cf. MÄUSER 1995, see illustration 1). However, after this quick and successful start of a natural history museum at Bamberg, a deep blow followed ERTHAL's death in 1795 because the new sovereign, archbishop Christoph Franz von BUSECK, showed no commitment towards the museum and it was even used as a hall for manufacturing crop sacks during the revolution wars. However, in 1803 a new period of productive science and the amassing of collections commenced when the collection of natural history objects from the monastery Banz arrived at Bamberg due to secularization. The last curator of the Banz collection, Dionysius LINDER, subsequently became the curator at Bamberg. The

Banz birds added enormously to the dozen or so surviving birds from the old Bamberg collection. From then onwards the collection of Bamberg showed a steady increase (cf. STEPHAN 1807a-e).

During many visits to the Bamberg natural history collection from childhood onwards, I realized the importance and potential of the avian collection there. In 1999 I therefore started a project of restoring data to Bamberg's bird specimens. This publication summarizes the methods of my project and some early results.

2. METHODS

Every bird specimen in the exhibition hall and from the cellar store rooms has been photographed by the volunteers Gertrud and Dieter DÖLLNER with a digital camera [Nikon Coolpix 990E, lens 3-x zoom Nikkor, focal length 8mm – 24mm]. The photos of the bird specimens have been taken while placed in a box [80 x 80 x 80 cm] with an interior painted in neutral white. Three fluorescent tubes have been used as a light source giving a sun-like condition [Osram L 18/12, each 18 Watt, colour code 12, ~ 5,000 Kelvin]. Larger specimens (about 60 birds) have had to be photographed in front of white canvas using photo studio lights and flashes. All photos bear a colour code reference from Kodak as well as a scale. Additional photos were taken of all labels written before 1900. Exposure time were 1/15s with apertures from 6.1 to 8.7 and focal lengths from 14.4 to 22.8 mm. Subsequently, the photos have been saved as JPEG files (normal format) and printed on discs. These images are the basis for later identification purposes and comparison with specimens of other natural history collections, thus giving the correct (sub-) species determination. In turn, knowledge of the subspecies limits the geographical area from which a certain specimen could have been collected.

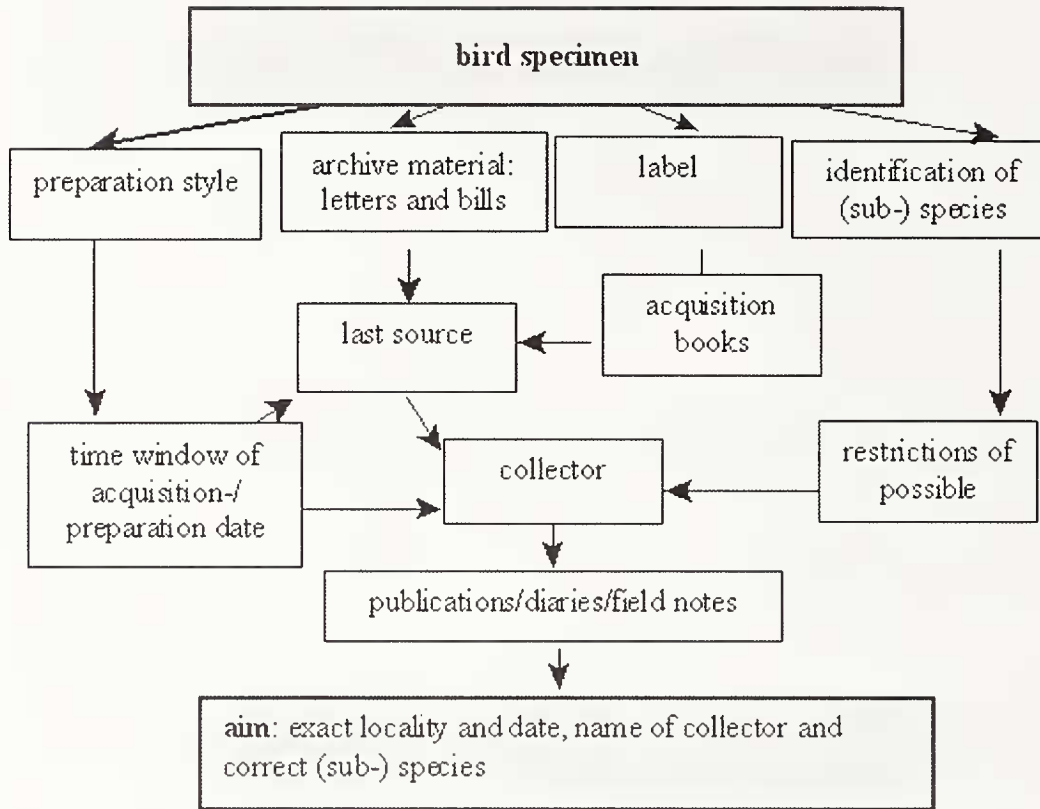


Fig. 1: Structure of the process of restoring data to an avian collection.

Individual data accompanying each bird specimen is also documented. The main data sources are labels or notes on bird stands, catalogue and acquisition entries, accompanying letters (in museums' and town archives), bills and publications, unpublished diaries and notebooks. Last but not least, the preparation style can indicate something about possible acquisition dates.

Combining all available data, i.e. the time window, the geographical region and the possible sources is normally enough to make only one or two collectors a possibility. Then diaries and field reports may confirm the probability of having found the correct collector, thus giving additional information on the exact collection locality and date (see fig. 1).

3. RESULTS

It is not yet possible to give a complete account of all bird specimens. A full documentation as part of a PhD is in preparation, but will take several years to complete. However, some surprising finds can already be mentioned.

Altogether, Bamberg's museum holds 1,550 mounted birds of about 800 species, 75 study skins of local species, 19 complete and 12 partial skeletons, 552 eggs and 112 nests. The mounted birds are still the key specimens of the old exhibition hall (fig. 2),



Fig. 2: Main exhibition hall of the Naturkunde-Museum Bamberg.

Foto: DÖLLNER & STEINHEIMER 2001

which has maintained its old settings and late 18th century features until today (MEYER 2001). For each species usually one, but when the sexes differ sometimes two or rarely up to 5 specimens are shown, indicating a Linnean understanding of nature. The specimens and the system used represented creation rather than evolution, especially as all curators who were responsible for the museum during the 19th century were trained clergymen.

The curators of the collection differed in the type and amount of ornithological material they obtained. Dionysius LINDER, who was curator from 1803 to 1838, increased the collection from less than a dozen specimens to several hundreds and Andreas HAUPT (curator 1838-1885) continued in this tradition. At the end of his career, the Bamberg Museum possessed about 1,000 bird specimens. But it was Georg FISCHER (curator 1885-1912), who started the careful documentation of all specimens by entering them in a catalogue. Since then this catalogue has been used as an acquisition book, telling exactly the amount of further material to arrive. Later curators, i.e. Michael KUNZ (1913-1916), Theodor SCHNEID (1917-1945), Oskar KUHN (1946-1951), Anton KOLB (1951-1984) and Alfred HERTLE (commissariat, 1984-1988), had little input into the important specimens of the avian collection. The present curator Matthias MÄUSER (from 1988 onwards), however, has a major interest in the history of the avian collection and supports collection based research.

3.1. Local material

As in many other local collections (cf. HANÁK 2000a, b; HANÁK & HUDECEK 2000; HUDECEK & HANÁK 2000; HUDECEK & HANÁK 1999), the natural history collection at Bamberg holds a few regionally important specimens, e.g. first county records, records of rare vagrants and records of a changing distribution pattern. Some of these specimens are even quoted in publications. One is a sub-adult Golden Eagle, *Aquila chrysaetos*, shot on the plains close to Neuhaus (North Bavaria) by the forest warden MATTICK in November 1860 (JÄCKEL 1863). Most of the known records of Golden Eagle from north of the Danube during the 18th and 19th century were shot out of curiosity or as a result of contemporary ideas about game management. However, their remains in collections now provide valid records for this rare species for the North Bavarian region, where it has not been observed in recent years. It is not yet certain from which population the Golden Eagle individual might have originated, but it seems likely to be a northern European bird (WÜST 1981). A specimen of the Rose-coloured Starling *Sturnus roseus* shot by the forest warden

MAAS in 1875 indicates a year of invasions of this species to Germany (WÜST 1986). The specimen of the Lesser Grey Shrike, *Lanius minor*, which is said to have been shot at Bamberg during the breeding season, documents well the changes of distribution over time. The species is now extinct throughout Germany (cf. WÜST 1986).

3.2. Exotic material

The most important specimens arrived from Munich in the years 1857-1864, when Bamberg acquired duplicate material via Carl Theodor Ernst von SIEBOLD (1804-1885) of the Zoological State Collection. Most of the Munich specimens are from Brazil, many actually from the gallery forests along the coast near Rio de Janeiro. I therefore extracted a list of all Brazilian specimens in the Munich collection register (vol. 1: acquisitions until 1910), thus summarizing possible collectors. All Brazilian specimens at Munich from pre-1864, for which some sort of collecting locality rather than just „Brazil“ are given, derive from three sources only.

The first is the famous Brazilian explorations of Johann Baptist von SPIX (1781-1826) & Carl Friedrich Philipp von MARTIUS (1794-1868) as well as of the Austrian Johann NATTERER (1787-1843) during the years 1817-1820 (NATTERER until 1835) on the occasion of the marriage of Erzherzogin LEOPOLDINA of Austria (1797-1826) with the crown prince Dom PEDRO, later Emperor PEDRO I OF BRAZIL, in 1817 (SICK 1984). NATTERER especially did extensive collecting. His huge collection subsequently went to Vienna museum; however, in 1840 Natterer visited Munich museum to exchange his duplicate specimens for Viennese desiderata (TIEFENBACHER 1983, SCHIFTER 1993).

The second source is the private collection of Maximilian von LEUCHTENBERG (~1817-1852) at Eichstädt, Bavaria, whose brother Karl August Eugène Napoleon von LEUCHTENBERG (1810-1835) collected in Brazil, returning many specimens to Eichstädt in 1829 (STURM 1841-47). Later it was Maximilian's sister, Amalie von LEUCHTENBERG (1812-1873), the second wife of PEDRO I OF BRAZIL after LEOPOLDINA died in 1826, who presumably sent specimens home during 1826-1831 (the latter is the year of PEDRO's abdication). In 1855 von LEUCHTENBERG's collection was given to Munich museum, when his family moved to Russia following his death.

The last source of Brazilian specimens is the collection of Georg Heinrich von LANGSDORFF (1774-1852), though only one remaining specimen at Munich is known. The biggest share of Brazilian birds at Munich until 1900, however, is still that of SPIX. I assume

therefore, that some of the specimens at Bamberg museum may have paratype status for names by SPIX.

Bamberg also obtained a share of bird specimens from the collection of the toucan expert Johann Heinrich Christian STURM (1805-1862) of Nürnberg, who translated John GOULD's Monograph of the Ramphastidae (1834) into German, adding new descriptions of his own (STURM 1841-47). This book, which is unknown to many ornithologists, greatly improved GOULD's original publication: the drawings are more accurate in colour and many of Johann NATTERER's field notes as well as notes by STURM himself were added. STURM was only able to extend GOULD's work by having his own reference material; he possessed a large bird collection, consisting of about 2700 specimens of 1700 species, including 62 specimens of Ramphastidae (STURM 1865). It was believed lost after its disposal in 1865, but many specimens have actually survived in the collections of Munich, Bamberg and, probably, at the University of Erlangen.

STURM (1841-1847) lists all toucan specimens which he had in his own collection at Nürnberg. Bamberg Museum has two of them still on display: an *Aulacorhynchus sulcatus*, which STURM obtained from Vienna Museum (collected at Santa Fé de Bogota) and a *Selenidera culik*, which was apparently obtained from Johann NATTERER (see fig. 3).

Moreover, STURM planned to publish German translations of the first volume of the Birds of Australia (GOULD 1837) and the monograph of the Trogonidae (GOULD 1838). However, as the surviving original manuscripts at the BMNH library at Tring show, STURM would not have added any of his own comments, as he probably lacked many Australian specimens in his collection. Despite some gaps in STURM's collection, Carl Hermann Conrad BURMEISTER (1807-1892), a collector of Argentinean specimens, spoke very well about it (STURM 1865).

It is also worth consideration that many of the early bird books printed at Nürnberg might have used speci-

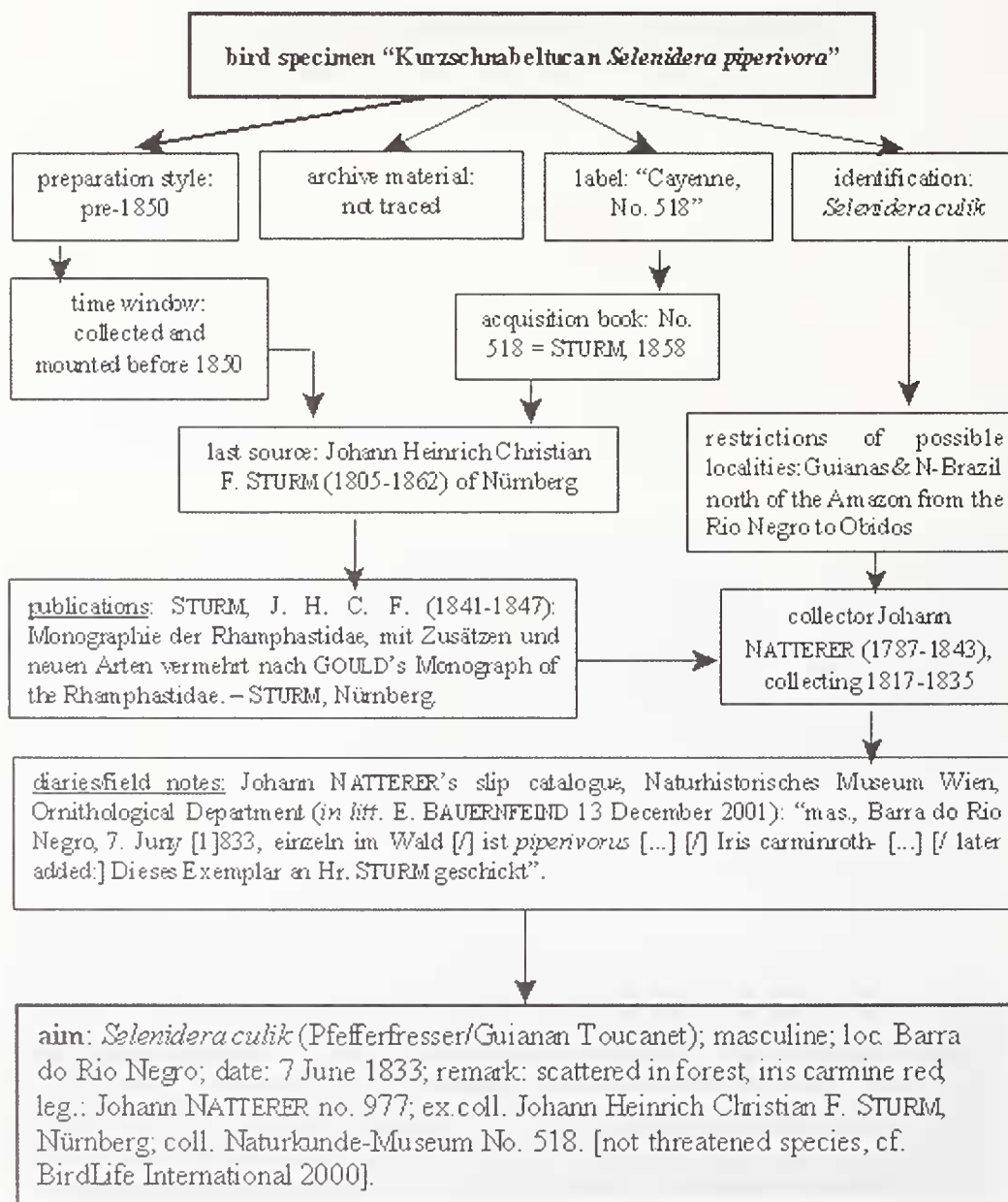


Fig. 3: An example of a complete restored history of one of Bamberg's specimens: *Selenidera culik* collected by Johann NATTERER.